City of Willoughby Hills

**Bid Specifications**

**Sealed bid proposals will be received at the City of Willoughby Hills Mayor's Office.**

**35405 Chardon Road, Willoughby Hills, Ohio**

**Until 12:00 p.m. on Friday, November 9, 2012,**

**And read immediately thereafter for the purchase of the following equipment.**

**FIRE HOSE**

**HYDRAULIC RESCUE TOOLS**

**THERMAL IMAGER**

**NOTE:**

**BIDDERS MAY SUBMIT A SEPARATE BID FOR: FIRE HOSE, HYDRAULIC RESCUE TOOLS AND THE THERMAL IMAGER.**

**BIDDERS MAY BID ON ONE CATEGORY, OR ALL THREE**

**FIRE HOSE: QUANTITY**

- Fifteen one-hundred foot long sections of five inch diameter supply hose.
- Six one-hundred foot long sections of three-inch diameter hose.
- Four one-hundred foot long sections of two and one-half inch diameter hose.
- Two fifty-foot long sections of two and one-half inch diameter hose.
- Six one-hundred foot long sections of two inch diameter hose.
- Twelve one-hundred foot long sections of one and three-fourths inch diameter hose.
- Six fifty-foot long sections of one and three-fourths inch diameter hose.

The outer jackets shall be impregnated in one of the standard NFPA colors, to be determined at time of purchase.

**FIRE HOSE: BID SPECIFICATIONS:**

**Five-inch supply hose**:

The hose shall be double jacket with a minimum service test pressure of 300 psi / 2070 kpa.

Jackets: The inner hose jacket shall have 100% filament polyester warp and weft yarn. The outer jacket shall be made with virgin spun polyester warp yarn and a minimum of 11.3 filament polyester weft yarn picks per inch (445 per Meter). The outer jacket shall be impregnated in one of the standard NFPA colors with high performance polymeric dispersion.

Lining: The lining (waterway) must be made from polyurethane and must be applied using a fused process that welds the polyurethane directly to the textile while the hose is being woven, without the use of adhesives or hot melt. The fused lining process must create a virtually inseparable un it without the use of adhesives, yielding an extremely low friction (pressure) loss by filling in the corrugations of the weave, creating an ultra thin and smooth waterway. Fire hose made using adhesives of any type do not meet this specification. The lining shall be approved for use with potable water.

Adhesion: The adhesion shall be such that the rate of separation of a 1 1⁄2" / 38mm strip of polyurethane, transversely cut, shall not be greater than 1/4" / 6mm per minute under a weight of 12 lbs / 5.5 kg.

Cold Temperature Flexibility: The hose must remain flexible to -65°F (-55°C).

Service, Test, Burst Pressures: Minimum service, test and burst pressures shall be as detailed in the specification table on the previous page.

Coupling Specifications

The coupling shall have the country of origin legibly marked on the outside surface as required in NFPA 1963. Five-inch Storz couplings are specified, hose must have a coupling that features "lock protector" technology.

Manufacture: Both hose and couplings must be manufactured in North America and be NAFTA compliant.

Warranty: The fire hose shall have a "Two Year All Hazards Warranty"

**Firefighting Hose with the following diameters: 3-inch, 2.5-inch, 2-inch, and 1.75-inch**

The hose shall be double jacket with a service test pressure of 400 PSI / 2750 KPA.

Jackets: Both inner and outer jackets shall be made with spun polyester yarns.

The outer jacket shall be made with virgin spun polyester warp yarn and a filament polyester weft yarn. Hose made using nylon or other materials shall not be considered as meeting this specification. The outer jacket shall have a minimum of 10 filament polyester weft yarn picks per inch (394 per Meter) and when requested shall be impregnated in one of the standard NFPA colors with high performance polymeric dispersion.

Lining: The lining (waterway) must be made from polyurethane and must be applied using a fused process that welds the polyurethane directly to the textile while the hose is being woven, without the use of adhesives or hot melt. The fused lining process must create a virtually inseparable unit without the use of adhesives, yielding an extremely low friction (pressure) loss by filling in the corrugations of the weave, creating an ultra-thin and smooth waterway. Fire hose made using adhesives of any type do not meet this specification. The lining shall be approved for use with potable water.

Adhesion: The adhesion shall be such that the rate of separation of a 1 1⁄2" / 38mm strip of polyurethane, transversely cut, shall not be greater than 1/4" / 6mm per minute under a weight of12lbs/5.5kg.

Cold Temperature Flexibility: The hose must remain flexible to -40°F (-40°C).

Flow And Friction Loss: 1 3⁄4 inch (44mm) diameter, 100 US GPM (379 LPM), shall not exceed 10.0 PSI (69 KPa) loss per 100 feet (30.5 M).

Service, Test, Burst Pressures: Minimum service, test and burst pressures shall be as detailed in the specification table on the previous page.

Kink Test: A full length will withstand a hydrostatic pressure of 600 psi / 4140 kPa while kinked.

Coupling Specifications: Couplings shall be in conformance with the current NFPA standard and made of extruded aluminum, hard coated a minimum of .002" thick. They shall be manufactured in North America and permanently labeled with country of origin. They shall be expansion ring type.

Thread: National Standard,

Size: 3-inch and 2.5-inch shall have 2.5 NST couplings

2-inch and 1.75-inch shall have 1.5-inch NST couplings

Manufacture: Both hose and couplings must be manufactured in North America and be NAFTA compliant.

**HYDRAULIC RESCUE TOOLS: QUANTITY**

One each, either new or used, of the following types of Electric-over-Hydraulic Tools:

(NEW OR DEMO)

Cutter,

Spreader

Ram,

Combination Cutter Spreader

Bid price shall include seven batteries, four battery chargers, one ram extender.

**HYDRAULIC RESCUE TOOLS: BID SPECIFICATIONS**

**Electric-over-hydraulic: Cutter**

1. The tool is designed to be a hydraulically operated piston activating mechanical joints symmetrically to open or close a set of two opposite blade arms whereby cutting surfaces go on top of each other without making contact thus enabling objects to be cut.
2. Devices do not need to be connected to an external hydraulic source, generation of the required hydraulic pressure takes place within the body of the device by either a quick exchange lithium/ion battery or an external power supply.
3. The tool is equipped with light-emitting diodes attached on the operating side to facilitate work under poor lighting conditions.
4. The cylinder of the tool shall be made of anti-corrosive light aluminum alloy for its lightweight, strength and long life. The body of the tool shall have a high impact, non-metallic housing. The housing shall have ventilation holes on both sides of the unit for cooling the motor.
5. The maximum cutter opening at the tips will be 7.28 in (185 mm)
6. The cutter will be of slightly curved blade geometry for pulling the debris away and to the center with intelligent cutter geometry reducing tool movement and providing maximum cutting performance.
7. The blades shall be made of investment cast dropped-forged steel which has a glass-pearl blasted finish and are regrind-able. The blades of the tool should be attached to the piston rod via removable links for ease of repair, efficient power transmission and smooth operation. The pivot points of the blades shall have a rubber booted hand guard for safety purposes.
8. The engineered curved blades with sophisticated geometry close at the tips and then pull the object to be cut towards the point where the maximum cutting force is applied to the relevant working range providing superior cutting performance and significantly reducing cutter wear.
9. The cutting performance of the tool shall be able to cut up to 1.50 in (38 mm) diameter round stock steel.
10. The tool shall have a dual pilot check valve to prevent accidental movement of the blades in the event of power loss.
11. The control mechanism shall feature a star-grip control actuator for ease of operation by allowing 360º operations in any position. The mechanism shall be separate and independent from the handle to provide added control in close-quarter operation.
12. The tool must provide a non-interflow shear seal “dead man” actuator, whereby the unit stops functioning when thumb pressure is released.
13. The opening and closing positions are clearly marked.
14. The tool shall be protected by a pressure relief valve that prevents it from being over pressurized.
15. The tool dimensions without the battery shall not be any longer than 36.41 (925 mm), wider than 11.81 in (300mm) or higher than 11.42 in (290 mm).
16. The maximum operating pressure to the tool will be 10,200 psi (70 MPa) (700 bar).
17. The nominal electrical voltage (with power supply) is 24 V. The nominal electrical voltage (with lithium/ion battery) is 25.2 V.
18. The tool shall be able to tolerate an ambient temperature range of -4ºF (-20ºC) up to +131ºF (+55ºC).

19. The tool must be NFPA 1936; 2010 Edition certified and shall be labelled as such bearing the mark of the testing agency.
20. Cutting classification A8/B9/C8/D9/E9.
21. The tool will not weigh more than 53 lbs (24.1 kg) without the battery or cable plug.

**Electric-over-hydraulic: Spreader**

1. The tool is a designed hydraulically activated piston with two equal, opposite light metal alloy spreader arms that are symmetrically opened by mechanical joints, thereby spreading objects. Closing the spreader arms is also carried out hydraulically and mechanically by reverse order of the piston.
2. Devices do not need to be connected to an external hydraulic source, generation of the required hydraulic pressure takes place within the body of the device by either a quick exchange lithium/ion battery or an external power supply.
3. The tool is equipped with lights to facilitate work under poor lighting conditions.
4. The cylinder of the tool shall be made of anti-corrosive light aluminum alloy for its lightweight, strength and long life. The body of the tool shall have a high impact, non-metallic housing. The housing shall have ventilation holes on both sides of the unit for cooling the motor.
5. The spreading force shall be up to 25,000 lbf.
6. The tool shall produce a maximum spreading distance of 23.8 in (605 mm).
7. The tool shall produce a maximum spreading force of 9,442 lbf (42 kN) and a minimum spreading force of 7,644 lbf (34 kN) measured 0.98 in. (25mm) from the tips. According to NFPA testing standards the HSF test point produced 8,993 lbf (40 kN), the LSF test point produced 7,419 lbf (33 kN).
8. To maximize the capability of the spreader the unit should include an optional chain and shackle package for pulling operations, use only HURST chain set KSV 11. This should not require the removal of the tips for attachment. The tool shall produce a maximum pulling force of up to 6,295 lbf (28 kN) and a minimum pulling force 5,058 lbf (22.5 kN) measured at the shackle holes. According to NFPA testing standards the HPF test point produced 5,171 lbf (23 kN), the LPF test point produced 4,272 lbf (19 kN).
9. The tool shall produce a pulling distance of 21.02 in (536 mm).
10. The tips are patented multifunctional tips that can be used for spreading, peeling, squeezing and pulling without the need to be changed. The tips are to be serrated and made from investment cast heat-treated steel.
11. The arms of the tool should be made of aluminum alloy and attach via removable links for ease of repair, efficient power transmission and smooth operation. The pivot points of the arms shall have a rubber booted hand guard for safety purposes.
12. The control mechanism shall feature a star-grip control actuator for ease of operation by allowing 360º operations in any position. The tool must provide a non-interflow shear seal “dead man” actuator, whereby the unit stops functioning when thumb pressure is released. The star grip automatically returns to the central position, guaranteeing the full load-holding.
13. The tool shall have two handles. One located at the center of the tool and the other located below the control mechanism. The center crossbar handle allows easy ergonomic manipulation from the center or either side.
14. The tool will be equipped with a dual pilot check valve. This is to prevent accidental movement of the arms in the event of power loss.
15. The tool shall be protected by a pressure relief valve that prevents it from being over pressurized.
16. The tool dimensions without the battery shall not be any longer than 35.24 (895mm), wider than 13.98 in (355 mm) or higher than 11.42 in (290 mm).
17. The maximum operating pressure to the tool will be 10,200 psi (70 MPa) (700 bar).
18. The nominal electrical voltage (with power supply) is 24 V. The nominal electrical voltage (with lithium/ion battery) is 25.2 V.
19. The tool shall be able to tolerate an ambient temperature range of -4ºF (-20ºC) up to +131ºF (+55ºC).
20. The tool must be NFPA 1936; 2010 Edition certified and shall be labelled as such bearing the mark of the testing agency.

21. The tool will not weigh more than 44 lbs (20.5 kg) without the battery or cable plug.

**Electric-over-hydraulic: Ram**

1. The Rescue Ram is a double-acting hydraulic cylinder. Extension and retraction is carried out hydraulically.
2. Devices do not need to be connected to an external hydraulic source, generation of the required hydraulic pressure takes place within the body of the device by either a quick exchange lithium/ion battery or an external power supply.
3. The tool is equipped with lights to facilitate work under poor lighting conditions.
4. The cylinder of the tool shall be made of anti-corrosive light aluminum alloy for its lightweight, strength and long life. The body of the tool shall have a high impact, non-metallic housing. The housing shall have ventilation holes on both sides of the unit for cooling the motor.
5. The rescue ram is a one-stage cylinder for applying pressure with a constant pressure force along the entire stroke.
6. The ram shall extend to a distance of up to 35 inches (905 mm). The retracted length is to be no less than 21 inches (545 mm).
7. The ram shall feature a single stage stroke. The maximum piston stroke shall be 14 inches (360 mm) producing a compressive force of up to 23,156 lbs (103 kN).
8. For ease of operation and high tensile strength there shall be a limit of one solid steel rod per tool.
9. The tool shall include heat-treated, investment-cast steel ram claw feet on the piston side and on the cylinder side for durable gripping and minimizing slippage.
10. To maximize the capability of the tool the unit should include an optional extension for the rescue cylinder, which may be used to enlarge the effectively possible opening width of an object thus allowing increased versatility. The maximum extended length with the extension accessory increases to 47.2 in (1198 mm).
11. The tool shall have a dual pilot check valve to prevent accidental movement of the piston rod in the event of power loss.
12. The control mechanism shall feature a star-grip control actuator for ease of operation by allowing 360 º operations in any position. The mechanism shall be separate and independent from the handle to provide added control in close-quarter operation.
13. The tool must provide a non-interflow shear seal “dead man” actuator, whereby the unit stops functioning when thumb pressure is released. The star grip automatically returns to the central position, guaranteeing the full load-holding.
14. The extend piston and retract piston are clearly marked.
15. The tool shall be protected by a pressure relief valve that prevents it from being over pressurized.
16. The tool dimensions without the battery shall not be any longer than 21.3 (542 mm), wider than 5.91 in (150 mm) or higher than 10.4 in (265 mm).
17. The maximum operating pressure to the tool will be 10,200 psi (70 MPa) (700 bar).
18. The nominal electrical voltage (with power supply) is 24 V. The nominal electrical voltage (with lithium/ion battery) is 25.2 V.
19. The tool shall be able to tolerate an ambient temperature range of -4ºF (-20ºC) up to +131ºF (+55ºC).
20. The tool must be NFPA 1936; 2010 Edition certified and shall be labelled as such bearing the mark of the testing agency.

21. The tool will not weigh more than 39 lbs (17.7 kg) without the battery or cable plug.

## Electric-over-hydraulic: Combination Cutter/Spreader

1. The tool is a designed hydraulically activated piston with two equal, opposite blade arms arms that are symmetrically opened by mechanical joints, thereby spreading, squeezing, pulling or cutting objects.
2. Devices do not need to be connected to an external hydraulic source, generation of the required hydraulic pressure takes place within the body of the device by either a quick exchange lithium/ion battery or an external power supply.
3. The tool is equipped with lights to facilitate work under poor lighting conditions.
4. The cylinder of the tool shall be made of anti-corrosive light aluminum alloy for its lightweight, strength and long life. The body of the tool shall have a high impact, non-metallic housing. The housing shall have ventilation holes on both sides of the unit for cooling the motor.
5. The maximum spreading force shall be up to 25,400 lbf (113 kN). The maximum spreading force measured .98 in (25mm) from the tips shall be up to 6,294 lbf (28 kN). NFPA HSF test point produced 8,318 lbf (37 kN), the LSF test point produced 5,395 lbf (24 kN).
6. The tool shall produce a spreading distance up to 14.2 in (360 mm) measured at the blade tips.
7. The tool shall produce a maximum pulling force of 9,217 lbf (41 kN). NFPA HPF test point produced 11,015 lbf (49 kN), the LPF test point produced 6,744 lbf (30 kN).
8. To maximize the capability of the combination tool the unit should include an optional chain and shackle package for pulling operations, use only HURST chain set KSV 8.
9. The tool shall produce a pulling distance of 14.6 in (371 mm).
10. The tips are patented multifunctional tips that can be used for spreading, peeling, squeezing and pulling without the need to be changed. The tips are to be serrated and made from investment cast heat-treated steel.
11. The tool shall product cutting forces up to 80,931 lbf (360 kN) measured at the rear end of the cutting surface and will be able to cut 1.18 in (30 mm) diameter round stock steel material.
12. The maximum cutter opening shall be 10.4 in (265 mm) and shall include a notch to focus maximum cutting force.
13. The blades of the tool shall be of a straight serrated edge design for maximum cutting performance. The blades shall have integral tips for spreading applications. The blades of the tool shall contain shackle holes for pulling applications. The blades of the tool should be attached to the piston rod via removable links, for ease of repair, efficient power transmission and smooth operation. The blades shall be made of investment cast dropped -forged steel glass pearl blasted for long-life and quality. The blades are regrind -able. The pivot points of the blades shall have rubber booted hand guard for safety purposes.
14. The control mechanism shall feature a star-grip control actuator for ease of operation by allowing 360 º operations in any position. The tool must provide a non-interflow shear seal "dead man" actuator, whereby the unit stops functioning when thumb pressure is released. The star grip automatically returns to the central position, guaranteeing the full load-holding.
15. The tool shall have two handles. One located at the center of the tool and the other located below the control mechanism. The center crossbar handle allows easy ergonomic manipulation from the center or either side.
16. The tool will be equipped with a dual pilot check valve. This is to prevent accidental movement of the arms in the event of power loss.
17. The tool shall be protected by a pressure relief valve that prevents it from being over pressurized.
18. The tool dimensions without the battery shall not be any longer than 35.75 (908 mm), wider than 8.86 in (225 mm) or higher than 11.42 in (290 mm).
19. The maximum operating pressure to the tool will be 10,200 psi (70 MPa) (700 bar).
20. The nominal electrical voltage (with power supply) is 24 V. The nominal electrical voltage (with lithium/ion battery) is 25.2 V.
21. The estimated current consumption at nominal voltage is 12 amps at idle mode and 36 amps at maximum load.
22. The tool shall be able to tolerate an ambient temperature range of -4ºF (-20ºC) up to +131ºF (+55ºC).
23. The tool must be NFPA 1936; 2010 Edition certified and shall be labelled as such bearing the mark of the testing agency. Cutting classification A6 / B7 / C7 / D7 / E7.
24. The tool will not weigh more than 43.7 lbs (19.8 kg) without the battery or cable plug.

**THERMAL IMAGER: QUANTITY**

One Thermal Imager with the following options:
(NEW OR DEMO)

320 x 240 higher resolution

Super Red Hot Colorization

Eclipse Electronic Thermal Throttle®

Eclipse LD SceneCatcher DVR

Eclipse numeric temperature display

Eclipse retractable lanyard

# THERMAL IMAGER: BID SPECIFICATIONS

**Warranty**
The manufacturer shall warrant the thermal imager and all charging systems free of defects in material and workmanship, under normal use and service, for a period of one year effective upon initial product activation. In addition, the imager's outer shell or housing shall carry a limited lifetime warranty.

**II. Service**
The manufacturer must be located in the U.S.A. and provide a full-service repair center in the U.S.A. to ensure timely and efficient processing of any service related issues concerning the imager. Warranty repairs must carry a guaranteed 48-hour turnaround (2 full business days from the time of receipt at the service center to the time that the manufacturer ships the imager).

Non-warranty repairs must carry a guaranteed 48-hour (2 full business days) turnaround from the time the manufacturer receives purchase order authorization to complete the repairs to the time the manufacturer ships the imager. Upon request, the manufacturer must provide the names and contact information for three (3) fire departments that can serve as references, verifying that the manufacturer complies with this requirement.

**III. Quality**
The manufacturer must ensure quality, design and manufacturing methods through third-party certification to ISO 9001, or its equivalent. To ensure that the product is of the highest quality, documentation must be presented upon request illustrating a battery of tests that have been conducted to verify water resistance, heat resistance and shock/impact resistance.

**IV. Physical Configuration**
The imager shall be a hand-held design, having a 3.5-inch LCD viewing screen.
Total weight of the imager shall not exceed 2 lbs. with the battery installed.
The imager shall ship in a re-usable delivery case. The imager shall include one rechargeable battery and a battery charger with AC adapters. The imager's physical dimensions shall be no more than four and a half (4.5) inches tall, five and a half (5.5) inches wide and eight (8) inches long.

**V. Durability**
The imager shall remain operational after being submerged under 3 feet of water for 30 minutes. The imager shall withstand a 6-foot drop in any orientation and sustain no operational damage. The manufacturer must perform these tests in front of designated department representatives at a mutually determined time and location. Failure to perform these tests in front of designated department representatives shall constitute non-compliance with this portion of the specification.

**VI. Technology**
The imaging technology shall utilize a 320x240 pixel un-cooled amorphous silicon (aSi) focal plane array. To ensure reliability, the detector must be designed and manufactured by a company that has provided, for at least five (5) years, detectors used in the fire service. A detector from a company without five (5) years of experience in the fire service is not acceptable. The Noise Equivalent Temperature Difference (NETD) shall be less than 50 mK.
The imager shall exhibit an ability to evade whiteout when pointed directly at flames. The detector shall operate with core temperature ranges of -40°F to 175°F. The dynamic range of the detector and associated electronics shall be nominally 1152°F. The detector spectral response shall be 7 to 14 microns. Mid-wave or short-wave infrared products that operate below this portion of the infrared spectrum (below 7.5 microns) are not acceptable due to unreliable performance in smoky conditions.

**VII. Image Colorization**
In order to provide a greater degree of safety, the imager shall utilize a tri-color automatic colorization mode available as an option or upgrade. This colorization mode shall utilize a yellow/orange/red color scheme. The display will show yellow colorization at temperatures of 500 degrees F to 799 degrees F, orange colorization at temperatures of 800 degrees F to 999 degrees F, and red colorization at temperatures of 1000 degrees F or hotter. Such colorization shall be gradient in nature so as to be able to discern scene details though the color (this requirement does not apply to manually engaged colorization).

**VIII. Outer Housing**
The imager shall be ergonomically designed, and the outer shell or housing must be manufactured from heat-resistant Ultem® thermoplastic. Due to the likelihood of rigorous use, the Ultem must be molded with color pigment throughout to mask small surface scratches. Outer shells or housings that are painted or otherwise lack consistent color through their entire thickness are not acceptable.

**IX. Colors**
The imager should be available in no less than seven scratch-resistant colors to allow for color-coding as needed by the department. Colors shall include, at a minimum: Red, Yellow, Black, White, Orange, Blue, and Lime-Yellow.

**X. Monitor/Screen**
The imager shall have a 3.5" diagonal LED backlit Liquid Crystal Display (LCD) screen. The display shall consist of no less than 76,800 pixels for high quality resolution. The screen must be visible in thick smoke to the operator while using it at arms-length. In addition, a clear polycarbonate cover must protect the display screen. This cover must be field-replaceable and watertight.

**XI. Lens**
The imager shall have a lens fabricated of germanium and have no less than a 42°x31° field of view.

**XII. Visual Indicators**
The imager shall have a battery status indicator on the viewing display to reduce imager size. Battery indicators that are not located on the display, such as separate LED based indicators, are unacceptable as they increase imager size. The imager shall be capable via option or upgrade to provide, on the viewing display, surface temperature measurement of objects. The imager must be able to provide simultaneous presentation of bar graph and numeric temperature indicators as well as separate presentation of either indicator. These temperature display options must be changeable by the user via a personal computer software program.

**XIII. Switches**
The imager shall use only one switch to activate the unit. The switch must be recessed and protected to avoid accidental shut-off. The switch shall be a mechanical capture switch which allows for automatic power restoration during a hot battery swap and eliminates the need for a "push and hold" mechanism for powering off that is associated with electronic switches. The imager must utilize a pair of switches that enable the activation of a manual colorization mode and an internally installed Digital Video Recorder (DVR). The imager shall incorporate a manual colorization mode, as an option or upgrade, which helps the user identify the hottest objects in a scene. This colorization mode must be manually adjustable by the user and colorize the hottest objects in a scene with a color that is unique to this mode. Thermal imagers that use yellow, orange, or red to identify hot objects for a manual colorization mode are not acceptable as they can easily be confused with the automatic colorizations modes which typically use such colors to designate fire and high heat conditions. The imager shall incorporate an internal DVR, as an option or upgrade, which enables the recording of thermal imaging video to the internal memory of the thermal imager. The DVR must be manually operable by the user enabling activation and deactivation with a button press.

**XIV. Strap Systems**
To reduce bulk, the imager must not have an integral strap system; however, the imager shall accommodate an available self-retracting strap. This retractable strap shall be attachable to a D-ring at the base of the thermal imager, under the display, and must be capable of holding the unit to the firefighter's body with the full weight of the imager, with battery, hanging unsupported from the strap.

**XV. Power Supply**
The imager shall be provided with a rechargeable battery and battery charger. The battery shall be a 2.4-volt nickel metal hydride (NiMH) pack, providing a minimum of 3 hours of continuous use (2 hours if a DVR is recording). The battery shall have an Ultem outer shell. The battery must be capable of being loaded into the housing only one way and must be inserted and removed by a person wearing standard firefighting gloves. A lithium-ion battery is an unacceptable substitute for NiMH due to lithium's higher risk of explosion when exposed to high heat.

**XVI. Operation**
Once the imager is registered (see section XVIII), the imager must be fully operational no more than four (4) seconds after activating the power switch. The imager must not have a standby switch or mode.

**XVII. Digital Video Recorder (DVR)**
The manufacturer must offer a DVR, internally housed in the thermal imager, capable of recording five hours of video in 640 x 480 resolution. Stored digital video shall download to the user's computer via USB connection. A time and date stamp shall be displayed at the beginning of recorded video for documentation purposes. Attachable DVRs are not acceptable as they increase total size and weight. The DVR must carry a one year warranty.

**XVIII. Customized Startup Graphics**
The imager must be equipped with the capability of providing customized factory-loadable and user-loadable startup graphics. These graphics will be shown on the imager's display during the startup sequence.

**XIX. Truck Mount**
The manufacturer must offer a truck mounted charging system to mount the imager and internal charging system in a vehicle or fire apparatus or on the wall of a fire station. The charging system shall come standard with an additional battery, all necessary mounting hardware, a direct charge system, and a connector that enables the use of an AC/DC power supply. The system must charge the battery in the imager at the same time it charges a spare battery utilizing separate charging systems. The battery in the imager must be charged through contacts on the imager. No cables or wires connecting the imager to the charging system are acceptable, nor are straps or other connecting devices to hold the imager to the truck mounting system. The system must be compliant to NFPA 1901 when properly mounted in a vehicle or fire apparatus. The truck mount must carry a one year warranty.

**XX. Orientation**
The manufacturer must make available, free of charge, an online product and application orientation program. This program shall include a rich, interactive, multimedia experience providing comprehensive product familiarization and detailed application courses. The courses will be self-paced and rich in multimedia content accompanied by voice presentation of course materials. At the completion of each course, the manufacturer must provide, via the orientation program, an individualized user assessment mechanism. PowerPoint, CD, or written orientation materials are unacceptable substitutes.

**XXI. Registration, Service and Support**
For added user security and cataloging of equipment, the manufacturer must utilize a user registration and support interface with the imager. This interface will enable the user to activate and register the imager for initial

use, maintain and organize equipment inventory, download future product updates and features, and enable other service and support functions.

**XXII. Security**

The imager shall also be equipped with an integral security feature which saves the registered user information to a separately accessible database in an effort to identify the rightful owner and provide for resource tracking and identification.

**XXIII. Delivery**

The manufacturer shall deliver the thermal imager in 30 days or less after receiving a purchase order.